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ABSTRACT

Over 60 studies which manipulated social class and type of reinforcement were examined to determine the extent of their support for the views that: (1) social classes differ in reinforcer preferences; and (2) social class differences can be attributed to the different cognitive-social developmental levels of the two populations. Although evidence to support both contentions exists and has been widely cited, there is, in fact, abundant counter evidence including failures to replicate important supportive studies. The developmental explanation is marred by findings of inconsistent age trends and by theoretical difficulties such as imprecise definitions of the stages of reinforcer preferences and the role of cognitive processes in the shift from one stage to another. (Author)

ABSTRACT

Social Class Differences in Reinforcer Effectiveness

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Over 60 studies which manipulated social class and type of reinforcement were examined to determine the extent of their support for the views that: (1) social classes differ in reinforcer preferences and (2) social class differences can be attributed to the different cognitive-social developmental levels of the two populations. Although evidence to support both contentions exists and has been widely cited, there is, in fact, abundant counter evidence including failures to replicate important supportive studies. The developmental explanation is marred by findings of inconsistent age trends and by theoretical difficulties such as imprecise definitions of the stages of reinforcer preferences and the role of cognitive processes in the shift from one stage to another.

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Social Class Differences in Reinforcer Effectiveness

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It has become common educational practice to use material reinforcers in behavior modification programs designed for lower-class children. Indeed, lower-class youngsters are presumed by many to require more concrete reinforcers than the verbal and abstract reinforcers which are effective for middle-class children. One explanation of the different reinforcer effectiveness for lower- and middle-class children is what Zigler (1970) calls the developmental notion. This view (also see Havighurst, 1970) holds that each person's hierarchy of reinforcers changes with age due to a progression of classes of reinforcers which occupy the topmost position. First material rewards are most effective, then their place is assumed by social reinforcement, and finally, knowledge of results. The superior performance of lower-class children with social reinforcement rather than knowledge of results, for example, is explained by their relative cognitive-social retardation reflected in slower hierarchical changes. Thus, the developmental notion holds a deficit view of the lower-class child.

The purpose of the present paper is to review the 60 or more studies which manipulated social class and reinforcement type to determine the extent and nature of the support for the hypothesis that social classes

differ in their reinforcer preferences and for the developmental notion. In particular, studies were examined for social class x reinforcer type interactions which would indicate that middle-class performance is facilitated with higher order reinforcers while lower-class performance is facilitated with lower order reinforcers. As an illustration, one important and widely cited study demonstrated middle-class superiority with light flashes as reinforcers while lower-class performance was best when rewarded with candy (Terrell, Durkin and Wiesley, 1959). Zigler and Kanzer (1962) found that knowledge of results facilitated middle-class performance and inhibited lower-class performance while social approval had the opposite effects. These and at least 20 other studies form the empirical base for the differential reinforcement hypothesis which asserts that social classes differ in reinforcer preferences and that lower order reinforcers are most effective with lower-class children while the opposite is true of middle-class youngsters (Table 1).

 Insert Table 1 about here

In the face of this support, there are 40 studies which failed to obtain social class x reinforcer interactions or main effects consistent with the differential reinforcement hypothesis (Table 2). These include many efforts to replicate important supportive studies such as those mentioned above. At least four replications or partial replications of the Zigler and Kanzer (1962) study failed to reproduce the original results (Baron, Bass, and Vietze, 1971; Blanton, 1967; McGrade, 1966; and Rosenhan and Greenwald, 1965). In spite of abundant counter evidence, faith in the

differential reinforcement hypothesis is reflected in the more frequent and sometimes exclusive citing of supportive studies (e.g., most recently, see McKeachie, 1974). The results of our review are compelling; social class differences cannot be assumed in spite of our predisposition to do so and the type of reinforcement cannot be predetermined by the social class membership of the subject or learner.

Insert Table 2 about here

The viability of the developmental explanation of whatever social class differences that may exist is open to question. Support for the notion has been obtained (e.g., Crandler and Goodwin, 1971; Reiner, 1972; and Zigler and deLabry, 1962). However, this support is subject to serious qualifications. Often age trends of reinforcer effectiveness implied by the developmental notion are not apparent in the data; indeed, they are sometimes contradictory. For example, one study obtained a social class x reinforcer type interaction using tangible reinforcers and knowledge of results with six year olds but not with ten year olds (Storm, Anthony, and Porsolt, 1965); another obtained similar interactions with both age groups (Terrell, Durkin, and Weisler, 1959) while a third obtained the interaction with older subjects but not with younger ones (Crandler and Goodwin, 1971; Swiggle and Coady, 1969).

Moreover, an analysis of social class x reinforcer type interactions revealed that many which support the hypothesis that social classes differ in reinforcer preferences lend only dubious support to the developmental

notion. These include interactions in which middle-class preference is for the higher order reinforcer, but lower-class performance is low and does not differ significantly across reinforcer type (Figure 1). Examples of interactions of this type include Crandler and Goodwin (1971), Spence (1972), Spence and Dutton (1967), Swiggle and Coady (1969), and Zigler and Kanzer (1962). The ineffectiveness of the lower order reinforcer for lower-class subjects is difficult for the developmental view to accommodate. Finally, there is evidence that shifts in hierarchical position do not occur for classes of reinforcers, contrary to the developmental notion. Material and social reinforcement, lower order reinforcers, maintain their effectiveness for older children. However, there is great variability in effectiveness within classes of reinforcers at and across age levels, suggesting that developmental trends may occur more within classes than between them.

 Insert Figure 1 about here

In all, these and other findings pose serious problems for the developmental notion as it now stands. Inconsistent age trends underscore the need to shore up the definition of the hierarchical stages and the factors which contribute to shifts in the stages. In regard to the latter point, the function of cognitive development in hierarchical shifts has been clouded by the finding of a social class x reinforcer type interaction when mental age was controlled (Zigler and deLabry, 1962). The implication of this finding is that other as yet unspecified factors

are responsible for the shifts and, thus, the theory is left without a major causal mechanism. The analysis of social class x reinforcer type interactions not only identified some as offering only weak support for the developmental view, but it also suggested that changes in hierarchical position may occur by the displacement of one class of reinforcers by another, represented by disordinal interactions or the accompaniment of one class with another, represented by ordinal interactions (Figure 2). Either the developmental notion must be altered to allow for both types of hierarchical changes or one must be identified as consistent with the theory. Finally, the large variability in reinforcer effectiveness within classes of reinforcers suggests that the developmental notion may be better characterized by a complex of hierarchies within classes of reinforcers than by a single hierarchy of reinforcer classes. If this is the case, the problem is much more complex than originally conceived, and substantial theoretical adjustments are called for.

 Insert Figure 2 about here

Some implications of the present review for the researcher are that designs should include all reinforcer levels (material, social and knowledge of results) to permit their direct comparison and that age should be included as an independent variable to supply information on developmental trends. Moreover, extraneous effects due to task, instructions, and experimenter variables must be controlled if sense is

to be made of the present, conflicting data and if some theoretical issues raised above are to be unravelled. Finally, there is the knotty methodological problem of assessing the relative effectiveness of classes of reinforcers while at the same time maintaining the value of the reinforcers representing the classes constant.

In the meantime, it seems to us that conclusions about social class differences must be held in abeyance and that the deficit view of the lower-class child implied by the developmental notion must be rejected.

Table 1

Studies Which Support the Differential Reinforcement Hypothesis

Study	Experimental Task	Age of Subject	Results
Tangible and Social Reinforcement			
Donovial (1966)	Discrimination Task		SES x Reinforcer interaction: Candy > Social reinforcement for LC; MC did not differ across reinforcer treatments. Reinforcer effect: Social reinforcement resulted in improved performance above baseline. SES effect: None.
Haggard (1954)	Performance on a "standard" intelligence test designed to reduce middle-class bias.	11 year olds	Encouragement during practice improved MC and LC scores on this standard test and LC scores on revised test. Monetary reinforcement during practice inhibited both SES groups on standard test although the drop in LC scores was of marginal reliability. Monetary reinforcement during testing raised scores on standard test for both SES groups, although increase for MC was of marginal reliability. Note: These results provide only qualified support for the differential reinforcement hypothesis as can be seen in the trend for LC groups to be inhibited by monetary reinforcement and MC groups to be facilitated by it.
Tangible Reinforcement and Knowledge of Results			
Camcron and Storm (1965)	Concept Learning Task	7-13 year olds	SES x Reinforcer interaction: KOR more effective

Study	Experimental Task	Age of Subject	Results
			with MC than LC and Indians. No significant differences with tangible reinforcement across MC, LC, and Indian groups. Reinforcer effect: None. SES effect: MC > LC and Indians.
Douvan (1956)	TAT measure of <u>n</u> : achievement	17 year olds (High school seniors)	SES x Reinforcer interaction: Interaction effect not reported. However, SES groups do not differ in material reward condition. When material reward was absent, MC > LC. Reinforcer effect: Not reported. SES effect: Not reported.
Higgins and Archer (1968)	Achievement and intelligence test performance	11 year olds (Sixth graders)	SES x Reinforcer interaction: Interaction effect not reported. However, LC with tangible > LC without tangible; Tangible reinforcement had no effect on MC. Reinforcer effect: None reported. SES effect: None reported.
Hoffman, Mitsos, and Frotz (1958)	Study A: Number tracing task. Study B: Intelligence test performance.	16-17 year olds (High school juniors and seniors.)	SES x Reinforcer interaction: Interaction effects not reported. For Study A, no difference between MC and LC in money condition. MC performance the same with money present or absent. With no money, LC performance significantly lower than when rewarded with money. For Study B, LC improvement > MC when both rewarded with money. Reinforcer effect: Money > no money.
Pierce (1970)	Academic school work	13 year olds (Eighth graders)	LC with payment for GPA improvement > LC without payment; payment had no effect on MC GPA.
Safer and Kornrich (1968) Experiment I	Discrimination task	5.4 and 11.5 year olds	SES x Reinforcer interaction: None. Reinforcer effect: KOR alone > KOR with tangible

Study	Experimental Task	Age of Subject	Results
Spence (1972)	Two alternative discrimination task	4-5 year olds	reinforcement. SES effect: Only MC subjects. SES x Reinforcer interaction: Interaction effect not tested. Direction of the means suggests MC > LC in verbal feedback condition. Neither SES group differed across reinforcement conditions. Reinforcer effect: None. SES effect: MC and LC groups analyzed separately.
Spence and Dutton (1967)	Discrimination task	5 year olds	SES x Reinforcer interaction: Specific reward x SES interaction effect not tested. Direction of means suggests LC unaffected by reward conditions; MC with KOR > MC with candy.
Terrell (1958)	Training and transposition tasks	4-5 and 8-9 year olds	SES x Reinforcer interaction: None. Reinforcer effects: Candy, tokens, and KOR do not differ and > promise of candy. SES effect: Only MC subjects.
Terrell, Durkin, and Wiesley (1959)	Training and discrimination tasks	5-6 and 10-11 year olds	SES x Reinforcer interaction: KOR more effective with MC than LC. Tangible has opposite effect. Reinforcer effect: None. SES effect: None.
Zigler and deLabry (1962)	Concept-switching task	6 year olds (Normal subjects)	SES x Reinforcer effect: KOR more effective with MC than LC. LC with tangible not significantly different from MC with tangible or LC with KOR. Reinforcer effect: tangible > KOR.
Social Reinforcement and Knowledge of Results			
Young and Beller (1966)	Discrimination task	5 year olds (Kindergarten)	SES x Reinforcer interaction: None Reinforcer effect: praise > KOR.

Study	Experimental Task	Age of Subject	Results
SES effect: Only LC subjects.			
Zigler and Kanzer (1962)	Marble-dropping task	7-8 year olds	SES x Reinforcer interaction: Social slight more effective with LC than MC. KOR more effective with MC than LC. Reinforcer effect: None. SES effect: None.
Tangible and Social Reinforcement and Knowledge of Results			
Blair (1972)	Discrimination task	9 year olds	SES x Reinforcer effect: Not tested. Reinforcer effect: Person (praise) and performance (KOR) > tangible for normal achievers. SES effect: Only MC subjects.
Crandler and Goodwin (1971)	Verbal conditioning	7 year olds (Second graders) and 11 year olds (Sixth graders)	SES x Reinforcer effect: For MC second graders, no differences across reinforcement conditions: for LC second graders, material > praise or KOR. For MC sixth graders, praise and KOR > material; for LC sixth graders, no differences across reinforcement conditions. Reinforcer effect: None. SES effect: None.
Hassett (1970)	Marble-dropping task		Culture x Reinforcer interaction: None (Anglo, Black, Navajo, and Spanish-American) Reinforcer effect: Candy > money, praise, and KOR. SES effect: Only LC subjects.
Pikulski (1970)	Word recognition task	6 year olds	SES x Reinforcer interaction: SES groups analyzed separately. MC social > MC KOR or tangible. LC performance did not differ across reinforcer

Study	Experimental Task	Age of Subject	Results
Reiner (1972)	Problem solving tasks and motor tasks	6, 8, and 10 year olds (First, third, and fifth graders)	conditions. Note: LC girls had same reinforcer preferences as MC subjects, qualifying the interaction effect. SES x Reinforcer effect: For problem solving tasks, by fifth grade MC more responsive to KOR and praise; LC responsiveness was for praise and tangible reinforcers. For motor tasks, no SES x Reinforcer interaction. SES effect: For problem solving tasks only, MC > LC.
Swiggle and Coady (1969)	Lever pressing task	6, 10 and 15 year olds	SES x Reinforcer interaction: For six year olds, both SES groups responded similarly across all reinforcement conditions. For 10 year olds, MC most responsive to praise; LC responsiveness to money and praise is the same. For 15 year olds, MC most responsive to praise, LC to money. Reinforcer effect: Money, praise, and money and praise > KOR; Money > praise and money and praise. SES effect: MC > LC for 10 and 15 year olds; for six year olds, no SES differences.
Terrell and Kennedy (1957)	Training and transposition tasks	4-5 and 8-9 year olds	SES x Reinforcer interactions: None. Reinforcer effect: Candy > praise, tokens, or KOR on training and transposition tasks for both age groups. SES effect: Only LC subjects.

Note: SES = Socioeconomic Status; MC = Middle-class; LC = Lower class; KOR = Knowledge of Results.

Table 2

Studies Which Do Not Support the Differential Reinforcement Hypothesis

Study	Experimental Task	Age of Subject	Results
Tangible and Social Reinforcement			
Baker (1970)	Modeling Task	5 year olds (Kindergarten)	SES x Reinforcer interaction: Not analyzed. Reinforcer effect: Candy and no reinforcement groups did not differ. SES effect: Only LC subjects.
Benowitz and Rosen- feld (1973)	Spelling Test	7 year olds (Fourth graders)	SES x Reinforcer interaction: None reported. Reinforcer effect: Tangible > social. SES effect: None.
Bresnahan (1966)	Concept Acquisition Tasks		SFS x Reinforcer Interaction: None. Reinforcer effect: None. SES effect: None.
Cohen (1970)	WISC Block Design Task	7 and 10 year olds (Second and Fifth graders)	SES x Reinforcer Interaction: None for second and fifth graders. Reinforcer effect: None. SES effect: MC > LC.
Greenbaum, Weiss, and Landau (1972)	Concept Switching Task	5-6 year olds	SES x Reinforcer Interaction: None. Reinforcer effect: Tangible > Social reinforcement. SES effect: None.
Graham (1970)	Intelligence Test	4-5 year olds (Pre-schoolers)	SES x Reinforcer Interaction: None. Reinforcer effect: None. SES effect: MC > LC.
Kirshman (1944)	Stanford-Binet Intel- ligence Test	7-14 year olds	SES x Reinforcer Interaction: None. Reinforcer effect: None. SES effect: Skilled > Unskilled.

Study	Experimental Task	Age of Subject	Results
Noonan and Barry (1968)	Marble-dropping task		SES x Reinforcer Interaction: Not tested. Reinforcer effect: Tangible > Social. SES effect: Only MC subjects.
Quay (1971)	Stanford-Binet Intelligence Test	4-5 year olds	SES x Reinforcer Interaction: Not tested. Reinforcer effect: None. SES effect: Only LC subjects.
Tiber and Kennedy (1964)	Intelligence Test	7-8 year olds	SES x Reinforcer Interaction: None. Reinforcer effect: None. SES effect: White MC > White LC > Black LC.
Tramontana (1972)	Marble-dropping Task	7-8 year olds	SES x Reinforcer Interaction: None. Reinforcer effect: Candy > praise and no reinforcement; praise > no reinforcement. SES effect: None.
Unikel, Strain, and Adams (1969)	Marble-dropping Task	5-6 year olds	SES x Reinforcer Interaction: Not tested. Reinforcer effect: None. SES effect: Only LC subjects.

Tangible Reinforcement and Knowledge of Results

Devlin (1971)	Concept Formation Task	7 year olds (Fourth graders)	SES x Reinforcer Interaction: None. Reinforcer effect: None. SES effect: None.
Fang (1966)	Concept Identification Task	12-14 year olds (Seventh, Eighth, and Ninth graders)	SES x Reinforcer Interaction: None. Reinforcer effect: None. SES effect: High SES > Low SES.
Fast (1967)	Difference between Standard and Experimental Administration of WISC.	10-11 year olds (Fifth and Sixth graders)	SES x Reinforcer Interaction: None reported. Reinforcer effect: None. SES effect: None reported.

Study	Experimental Task	Age of Subject	Results
Keogh and MacMillan (1971)	Digit Span Recall Task	8 year olds (Third graders)	SES x Reinforcer Interaction: None. Reinforcer effect: None. SES effect: None. Note: KOR not used; subjects were told to "do their best."
Kirwin (1968)	Discrimination and Conceptual Tasks	7-8 year olds (Second and Third graders)	SES x Reinforcer Interaction: Not tested. Reinforcer effect: None. SES effect: Only LC Subjects.
Lighthall and Cerminus (1967)	Concept Switching Task	4-5, 5-6, and 6-7 year olds	SES x Reinforcer Interaction: Not tested. Reinforcer effect: None. SES effect: Only "blue collar" subjects.
Safer and Kornrich (1968) Experiment II	Discrimination Task	6-7 and 10-11 year olds	SES x Reinforcer Interaction: None. Reinforcer effect: None. SES effect: None.
Shores (1969)	Size Discrimination Task	7 year olds (Fourth graders)	SES x Reinforcer Interaction: None. Reinforcer effect: None. SES effect: MC > LC.
Spence (1970)	Verbal Discrimination Task	7-8 year olds (Second and Third graders)	SES x Reinforcer Interaction: Not tested. SES groups analyzed separately. Reinforcer effect: KOR > Candy for both LC and MC. SES effect: Not tested.
Spence (1971)	Concept Identification Task	5 year olds	SES x Reinforcer Interaction: Not tested. Reinforcer effect: KOR > Tangible for four comparisons in which subjects were trained on task and for three of four comparisons without training. SES effect: Only LC subjects.
Spence and Segner (1967)	Discrimination Task	8-9 year olds	SES x Reinforcer Interaction: None. Reinforcer effect: KOR > Tangible.

Study	Experimental Task	Age of Subject	Results
Storm, Anthony, and Porsoltz (1965)	Persistence Task	5-6 and 10-11 year olds	SES effect: MC > LC. Subculture x Reinforcement Interaction: For 5-6 year olds, both MC and LC New Zealanders of European background performed more in without tangible reinforcement than with it. Maoris followed opposite trend. For 10-11 year olds, there was no interaction. Reinforcer effect: None. Subculture effect: None.
Sweet and Rigness (1971)	WISC Verbal I.Q. Test	6-13 year olds	SES x Reinforcer Interaction: MC whites not affected by money or KOR; LC whites perform better with KOR or money than with standard WISC administration. However, there was no difference for LC whites in KOR and money con- ditions. LC Blacks did not differ across rein- forcer treatments. Reinforcer effect: None reported. Means suggest monetary > KOR. SES effect: None reported. Means suggest MC whites > LC whites > LC Blacks.

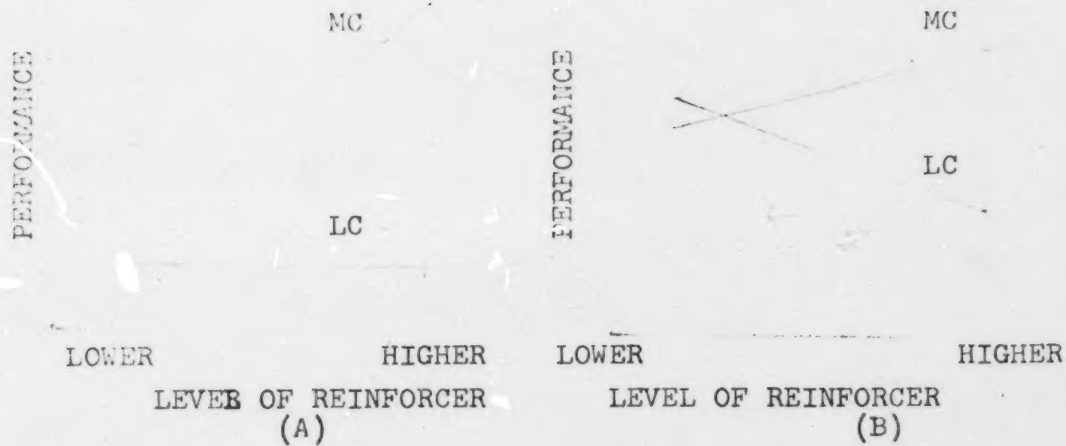
Social Reinforcement and Knowledge of Results

Baron, Bass, and Vietze (1971)	Word Recognition, Vis- ual Perception, and Manual Dexterity Tasks	19 year olds Reinforcer effect:	SES x Reinforcer Interaction: Not tested. None for word recognition and visual perception tasks; for manual dexterity, KOR > social when rate of reinforcement is relatively low. SES effect: Only LC subjects.
Barow and Ganz (1972)	Form Discrimination Task	10-11 year olds	SES x Reinforcer Interaction: Not tested. Reinforcer effect: None. SES effect: Only LC subjects.

Study	Experimental Task	Age of Subject	Results
Blanton (1967)	Verbal Conditioning Task	8 year olds (Third graders)	SES x Reinforcer Interaction: None. Reinforcer effect: None. SES effect: None.
Galdieri, Barcikowski, and Witmer (1972)	WISE I.Q. Test	8 year olds (Third graders)	SES x Reinforcer Interaction: None. Reinforcer effect: None. SES effect: MC > LC.
Martens (1972)	Motor Task	7-11 year olds (Fourth, Fifth, and Sixth graders)	SES x Reinforcer Interaction: None. Reinforcer effect: None. SES effect: None.
McGrade (1966)	Marble-dropping Task	5, 7, and 9 year olds (Kindergarten, Second, and Fourth graders)	SES x Reinforcer Interaction: None. Reinforcer effect: None. SES effect: None.
Rosenhan and Greenwald (1965)	Marble-dropping Task	7 and 11 year olds (Second and Sixth graders)	SES x Reinforcer Interaction: None. Reinforcer effect: None. SES effect: None.
Rucinski (1968)	Number Cancellation Task	10 year olds (Fifth graders)	SES x Reinforcer Interaction: LC and MC subjects did not differ in praise or KOR conditions. Note: Qualified support was obtained for the differential reinforcement hypothesis in that for MC boys only KOR > Praise.
Tangible and Social Reinforcement and Knowledge of Results			
Kulberg (1967)	Paired Associate Learning Task	6, 10, and 14 year olds (First, Fifth, and Ninth graders)	SES x Reinforcer Interaction: None at First, Fifth, and Ninth grade levels. Reinforcer effect: For First grade boys, Token > Candy, Approval, and KOR. For Fifth graders,

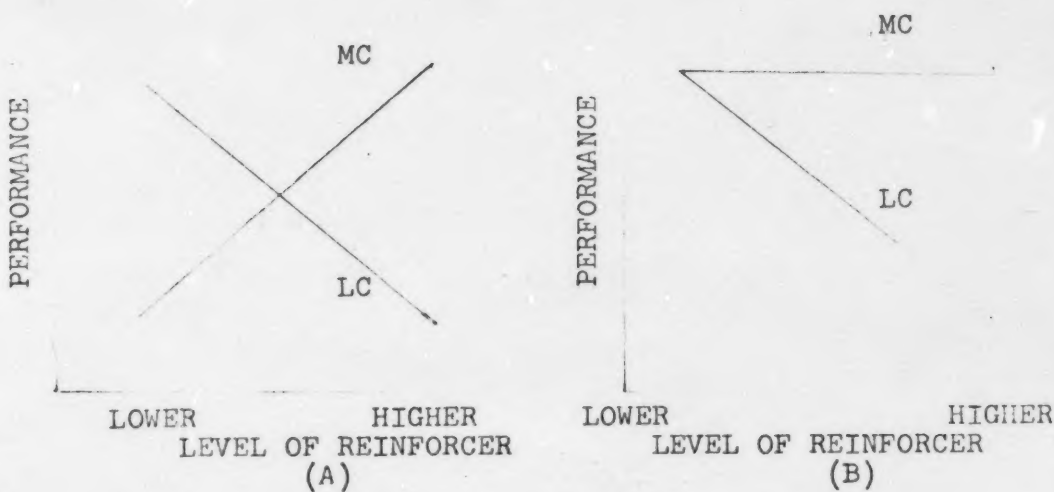
Study	Experimental Task	Age of Subject	Results
			Candy and Approval > Tokens and KOR. For Ninth graders, no differences across reinforcer conditions. SES effect: None.
Marshall (1969)	Color Discrimination Task	5 year olds (Kindergarten)	SES x Reinforcer effect: For MC, verbal KOR and praise > material. For LC, material and praise are the same. Verbal KOR > both material and praise. Reinforcer effect: Immediate verbal (KOR) > delayed material. SES effect: None. Note: In this study the SES groups performed similarly in all conditions except the delayed verbal (praise) treatment. In this respect the findings support the differential reinforcement hypothesis.
McGrade (1968)	Discrimination Task	7-8 year olds	SES x Reinforcer Interaction: None. Reinforcer effect: None. Light and Candy combined > combination of two verbal reinforcers. SES effect: None.
Miscellaneous			
Chinn (1967)	Concept Switching Task	Elementary School	SES x Reinforcer Interaction: None. Reinforcer effect: None. (The conditions were: candy, a paper taken to redeem for an unknown reward, and a promise of a reward.) SES effect: None.
King (1970)	Size-preference Motor Task	4-5 year olds (Pre-schoolers)	SES x Reinforcer Interaction: Not tested. Reinforcer effect: Only verbal praise used. SES effect: None.
Note: SES = Socioeconomic Status; MC = Middle-class; LC = Lower class; KOR = Knowledge of Results.			

Figure 1



Two hypothetical SES x Reinforcer Interactions in which lower-class performance does not differ significantly across levels of reinforcers.

Figure 2



Hypothetical SES x Reinforcer Interactions in which higher order reinforcers displaces the lower order reinforcer (A) or accompanies it (B).

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